



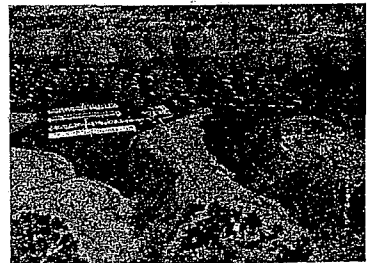
State of California
The Resources Agency

Department of
Water Resources



The California State Water Project— Appendix D Costs of Recreation and Fish and Wildlife Enhancement

**Bulletin 132-78
April 1978**



ON THE COVER: Bidwell Canyon Marina at Lake Oroville during the 1976-77 drought.

Department of
Water Resources

Bulletin 132-78

**The California State
Water Project—
Appendix D
Costs of Recreation and Fish
and Wildlife Enhancement**

April 1978

Huey D. Johnson
Secretary for Resources

**The Resources
Agency**

Edmund G. Brown Jr.
Governor

**State of
California**

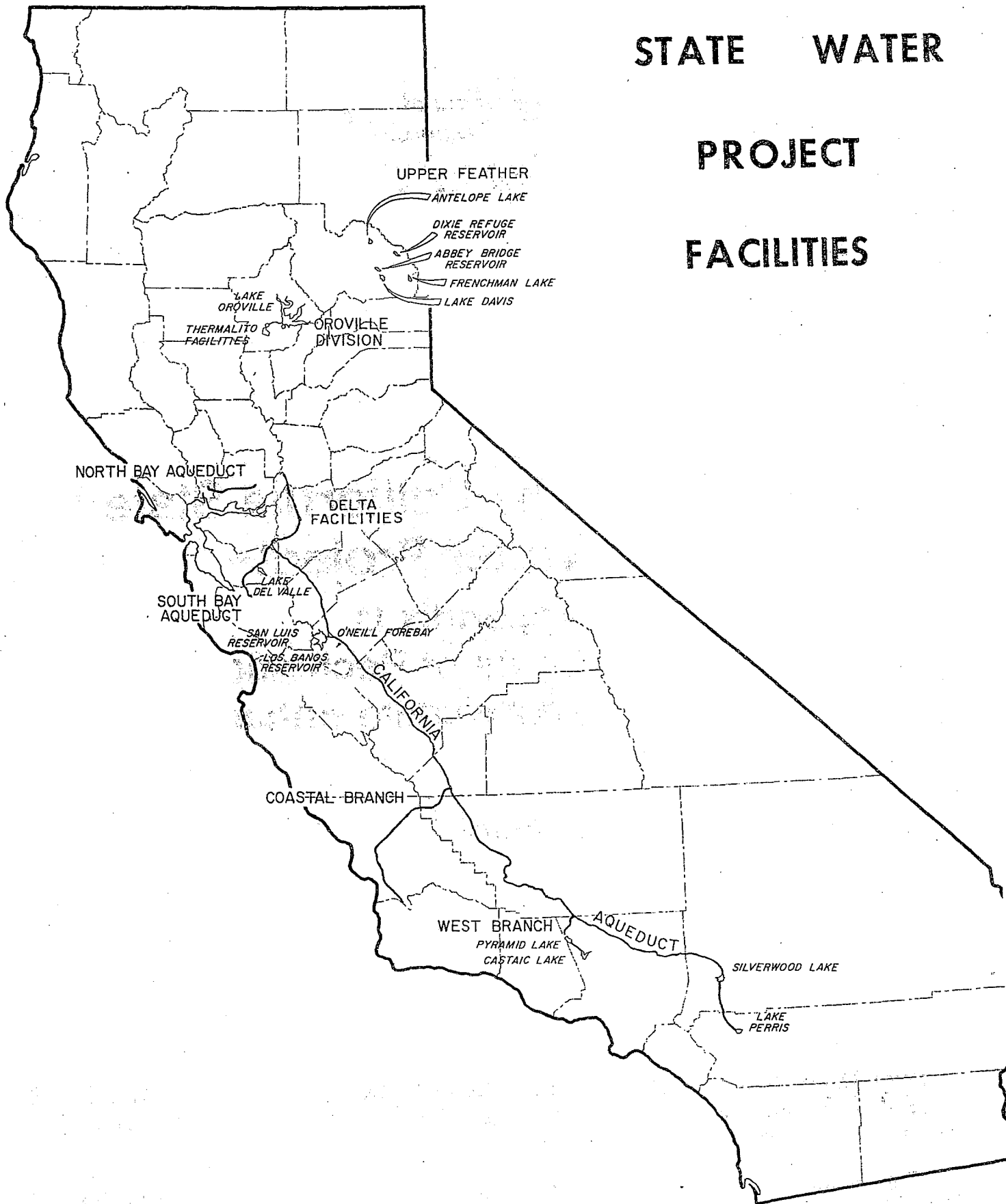
Ronald B. Robie
Director

**Department of
Water Resources**

STATE WATER

PROJECT

FACILITIES

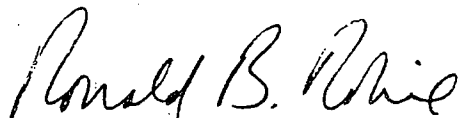


FOREWORD

The Davis-Dolwig Act (Sections 11900-11925 of the California Water Code) declares that recreation and fish and wildlife enhancement costs of State water projects benefit all of the people of California and are to be borne by them. The Act also provides a procedure through which the Department of Water Resources will be reimbursed for those recreation and fish and wildlife enhancement expenditures that are financed by project funds. The Department is to annually report such expenditures to the Legislature. If the Legislature approves the reported costs, a like amount of the State's tideland gas and oil revenues will be released to the Department from a continuing \$5,000,000 annual appropriation of tideland revenues which has been authorized specifically for that purpose (Public Resources Code Section 6217).

This constitutes the Department's 1978 report to the Legislature in compliance with the above requirement. An additional \$1,029,820 for recreation and fish and wildlife enhancement is reported herein. This amount consists of \$1,031,629 for joint capital costs of the State Water Project which are allocated to recreation and fish and wildlife enhancement, less \$1,809 for specific recreation land costs. The additional amount is mostly due to costs incurred in 1977 and interest accrued during 1977 on recreation costs not yet reimbursed by the continuing annual appropriation. The Department requests that the additional amount be approved.

Included in this report is a revised derivation of allocation percentages for the Oroville Division.



Ronald B. Robie, Director
Department of Water Resources
The Resources Agency
State of California

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State of California
EDMUND G. BROWN JR., Governor

The Resources Agency
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REPORTING OF RECREATION AND FISH AND WILDLIFE ENHANCEMENT COSTS

Section 11912 of the California Water Code assigns to the Department of Water Resources the following responsibilities:

It shall be the duty of the Department to report annually to the Legislature the costs, if any, which the department has allocated to recreation and fish and wildlife enhancement for each facility of any state water project. The department shall also report to the Legislature any revisions which the Department makes in such allocations.

The department shall submit each such cost allocation to the Department of Navigation and Ocean Development, to the Department of Parks and Recreation, and to the Department of Fish and Game. The Department of Navigation and Ocean Development, the Department of Parks and Recreation, and the Department of Fish and Game shall file with the Department of Water Resources their written comments with respect to each such cost allocation, which written comments shall be included in the report required by this section.

It shall also be the duty of the department to report to the Legislature on any expenditure of funds for acquiring rights-of-way, easements and property pursuant to Section 346 for recreation development associated with such facilities...

This appendix constitutes the Department's 1978 report as required by Section 11912 of the California Water Code.

For brevity, "fish and wildlife enhancement" is hereafter referred to as "enhancement". The Department's cost allocations treat recreation and enhancement as one combined purpose of the State Water Project.

Organization of Report

The costs of State Water Project facilities which the Department has allocated to recreation and enhancement through December 31, 1977, are shown in Table 1, pages 6 and 7, together with expenditures for acquiring rights of way, easements, and property for recreation development associated with such facilities. Table 2, on pages 12 and 13, details the accrued interest charges that are included in the costs shown in Table 1.

The notes to Table 1, on pages 8 through 11, contain an explanation of the Department's procedures for reporting recreation and enhancement costs, a description of how the amounts shown in the Table are calculated, and a reconciliation of significant changes from costs shown in previous reports.

A revised derivation of allocation percentages for the Oroville Division is included in this report. The derivation of allocation percentages indicated for joint capital costs of those multipurpose facilities listed in the upper portion of Table 1 (except the Oroville Division, which is reported herein) have been described in previous reports. Copies of those descriptions are available on request to the Department.

A summary of allocation percentages is shown on page 14, including, illustrative allocation percentages for facilities which have not been reported.

Included at the end of this report, are comments by the Department of Navigation and Ocean Development, the Department of Parks and Recreation and the Department of Fish and Game.

TYPE OF COSTS, PROJECT FACILITY, AND SOURCE OF FUNDS	DISBURSEMENTS							
	1952- 1964	1965	1966	1967	1968	1969	1970	1971
JOINT CAPITAL COSTS ALLOCATED TO RECREATION AND ENHANCEMENT: (b)								
<u>Frenchman Dam and Lake (78.5%)</u>								
California Water Resources Development Bond Fund	4,507	4,451	16,918	65,092	2,258	46	1,291	7,199
All other funds	2,428,838	-5	6		515	1,193	260	226
Subtotal	2,433,345	4,446	16,924	65,092	2,773	1,239	1,551	7,425
<u>Antelope Dam and Lake (100.0%)</u>								
California Water Resources Development Bond Fund	515,327	259,598	36,676	151,356	18,566	9,831	19,119	24,350
All other funds	3,701,503	145	12	2	21,504	207,412	5,003	3,028
Subtotal	4,216,830	259,743	36,688	151,358	40,070	217,243	24,122	27,378
<u>Grizzly Valley Dam and Lake Davis (94.9%)</u>								
California Water Resources Development Bond Fund	504,542	930,749	1,700,233	488,205	173,666	23,497	5,707	9,610
All other funds	217,607	3,968	35,862	12,395	13,025	157,200	62,211	738
Subtotal	722,149	934,717	1,736,095	500,600	186,691	180,697	67,918	10,348
<u>San Luis Dam and Reservoir, O'Neill Forebay, and Los Banos Reservoir (3.4%)</u>								
California Water Resources Development Bond Fund	719,038	729,817	472,303	124,063	18,234	-1,610	6,575	5,082
All other funds	1,245,513	-10,088	65,957	4,164	47,122	39,624	315	1,460
Subtotal	1,964,551	719,729	538,260	128,227	65,356	38,014	6,890	6,542
<u>California Aqueduct, Delta to Dos Amigos P.P. (3.4%)</u>								
California Water Resources Development Bond Fund	430,128	804,604	1,455,558	1,355,721	244,039	76,638	80,303	16,390
All other funds	297,063	-3,608	-11,083	20,537	194,006	166,778	47,343	3,143
Subtotal	727,191	800,996	1,444,475	1,376,258	438,045	243,416	127,646	19,533
<u>Oroville Division (2.9%)</u>								
California Water Resources Development Bond Fund	1,180,431	962,834	2,247,395	1,335,209	87,514	26,289	7,453	7,843
All other funds	2,770,396	36,109	18,608	37,774	321,811	87,591	17,840	5,329
Subtotal	3,950,827	998,943	2,266,003	1,372,983	409,325	113,880	25,293	13,172
<u>Del Valle Dam and Lake Del Valle (48.0%)</u>								
California Water Resources Development Bond Fund	426,845	738,461	2,923,153	5,529,695	841,108	3,894	19,510	23,848
All other funds	594,032	130	2,760	387,848	1,026,256	84,929	45,203	2,700
Subtotal	1,020,877	738,591	2,925,913	5,917,543	1,867,364	88,823	64,713	26,548
TOTAL	15,035,770	4,457,165	8,964,358	9,512,061	3,009,624	883,312	318,133	110,946
SPECIFIC COSTS OF ACQUIRING LAND FOR RECREATION DEVELOPMENT: (c)								
<u>Frenchman Dam and Lake</u>								
California Water Resources Development Bond Fund	232	642	1,504	521	162	28	182	108
All other funds	49,643				223	74		7
Subtotal	49,875	642	1,504	521	385	102	182	115
<u>Grizzly Valley Dam and Lake Davis</u>								
California Water Resources Development Bond Fund	28,517	4,147	19,086	164,798	-13,724	324	625	343
All other funds	5,246							
Subtotal	33,763	4,147	19,086	164,798	-13,724	324	625	343
<u>Abbey Bridge Dam and Reservoir</u>								
California Water Resources Development Bond Fund		9						
All other funds	9,921							
Subtotal	9,921	9						
<u>San Luis Dam and Reservoir, O'Neill Forebay, and Los Banos Reservoir</u>								
California Water Resources Development Bond Fund	-51,126	81,636	188,069	5,863	1,950	1,048	47,113	1,964
All other funds	190,378	-3,304	41,216	-1,068	2,681	1,132	-272	470
Subtotal	139,252	78,332	229,285	4,795	4,631	2,180	46,841	2,434
<u>California Aqueduct, Delta to Dos Amigos P.P.</u>								
California Water Resources Development Bond Fund	-12,902	526,849	-86,153	27,620	5,102	14,816	4,491	-9,744
All other funds	90,979	-624	-71	-80	3,796	11,337	1,343	1,117
Subtotal	78,077	526,225	-86,224	27,540	8,898	26,153	5,834	-8,627
<u>Oroville Division</u>								
California Water Resources Development Bond Fund	251,097	551,385	1,038,217	34,027	-1,484	-6,886	4,160	10,135
All other funds	242,308	-4,549	-3,928	-34,911	80,622	34,685	4,927	4,437
Subtotal	493,405	546,836	1,034,289	-884	79,138	27,799	9,087	14,572
<u>Del Valle Dam and Lake Del Valle</u>								
California Water Resources Development Bond Fund	25,003	70,463	8,581	489,259	-74,659	-1,490	1,629	600
All other funds	30,881	-852			-72,983	960	190	159
Subtotal	55,884	69,611	8,581	489,259	-147,642	-530	1,819	759
<u>California Aqueduct, Dos Amigos P.P. to Terminal</u>								
California Water Resources Development Bond Fund	6,303	53,523	99,440	171,863	65,934	53,071	470,680	30
All other funds	16,969				5,225	6,171	1,638	2,960
Subtotal	23,272	53,523	99,440	171,863	71,159	59,242	472,318	2,990
<u>Castaic Dam and Lake</u>								
California Water Resources Development Bond Fund	30,311	398,203	492,805	915,109	-18,073	-44,600	22,812	17,483
All other funds	10,510			-75	44,752	7,038	1,028	7,810
Subtotal	40,821	398,203	492,805	915,034	26,679	-37,562	23,840	25,293
<u>Cedar Springs Dam and Silverwood Lake</u>								
California Water Resources Development Bond Fund	90,854	18,469	88,949	64,091	43,779	32,470	36,168	19,633
All other funds	41,123				-211,153	322,523	27,302	-12,302
Subtotal	131,977	18,469	88,949	64,091	-167,374	354,993	63,470	7,331
<u>Parris Dam and Lake Parris</u>								
California Water Resources Development Bond Fund	377,886	-25,390	-13,884	20,994	492,881	-1,943	4,195	2,600
All other funds	234,997				3,721,737	-333,922		
Subtotal	612,883	-25,390	-13,884	20,994	4,214,618	-335,865	4,195	2,600
TOTAL	1,669,130	1,670,617	1,873,831	1,858,011	4,076,768	96,836	627,963	47,810
TOTAL RECREATION AND ENHANCEMENT COSTS								
California Water Resources Development Bond Fund	4,526,993	6,110,450	10,688,850	10,943,486	1,887,253	185,423	732,013	137,474
All other funds	12,177,907	17,332	149,339	426,586	5,199,139	794,725	214,083	21,282
GRAND TOTAL	16,704,900	6,127,782	10,838,189	11,370,072	7,086,392	980,148	946,096	158,756

Footnotes a-g are presented on pages 8 through 11.

BY CALENDAR YEAR						TOTAL DISBURSE- MENTS THRU 1977	ADD: INTEREST ACCRUALS THRU 1977	TOTAL COSTS REPORTED THRU 1977	COMPARISON WITH COSTS PREVIOUSLY REPORTED	
1972	1973	1974	1975	1976	1977				THRU 1976	INCREASE
1,235						102,997	1,803	104,800	104,812	-12
<u>1,600</u>	<u>961</u>	<u>1,268</u>	<u>493</u>	<u>1,414</u>	<u>1,518</u>	<u>2,438,287</u>		<u>2,438,287</u>	<u>2,436,489</u>	<u>1,798</u>
2,835	961	1,268	493	1,414	1,518	2,541,284	1,803	2,543,087	2,541,301	1,786
1,605						1,036,428	98,396	1,134,824	1,134,801	23
<u>2,096</u>	<u>1,394</u>	<u>1,949</u>	<u>762</u>	<u>2,701</u>	<u>2,893</u>	<u>3,950,404</u>		<u>3,950,404</u>	<u>3,946,963</u>	<u>3,441</u>
3,701	1,394	1,949	762	2,701	2,893	4,986,832	98,396	5,085,228	5,081,764	3,464
1,662						3,837,871	400,667	4,238,538	4,238,390	148
<u>2,617</u>	<u>24,130</u>	<u>45,689</u>	<u>84,814</u>	<u>21,984</u>	<u>9,183</u>	<u>691,423</u>		<u>691,423</u>	<u>681,729</u>	<u>9,694</u>
4,279	24,130	45,689	84,814	21,984	9,183	4,529,294	400,667	4,929,961	4,920,119	9,842
19,155	-275	-388	-262	-174	-130	2,091,428	293,948	2,385,376	2,330,911	54,465
<u>5,719</u>	<u>9,611</u>	<u>13,036</u>	<u>12,168</u>	<u>6,048</u>	<u>6,927</u>	<u>1,447,576</u>		<u>1,447,576</u>	<u>1,433,649</u>	<u>13,927</u>
24,874	9,336	12,648	11,906	5,874	6,797	3,539,004	293,948	3,832,952	3,764,560	68,392
4,026	-30					4,467,377	740,987	5,208,364	5,089,441	118,923
<u>6,742</u>	<u>7,875</u>	<u>12,394</u>	<u>21,653</u>	<u>3,674</u>	<u>50,530</u>	<u>817,047</u>		<u>817,047</u>	<u>809,186</u>	<u>7,861</u>
10,768	7,845	12,394	21,653	3,674	50,530	5,284,424	740,987	6,025,411	5,898,627	126,784
4,655	-37	-42	-18	-15	-14	5,859,497	1,760,449	7,619,946	7,557,526	62,420
<u>10,773</u>	<u>23,722</u>	<u>26,449</u>	<u>29,052</u>	<u>30,645</u>	<u>518,812</u>	<u>3,934,911</u>		<u>3,934,911</u>	<u>3,414,049</u>	<u>520,862</u>
15,428	23,685	26,407	29,034	30,630	518,798	9,794,408	1,760,449	11,554,857	10,971,575	583,282
40,248						10,546,762	4,283,722	14,830,484	14,602,023	228,461
<u>6,681</u>	<u>9,640</u>	<u>116,010</u>	<u>7,997</u>	<u>11,276</u>	<u>11,164</u>	<u>2,306,626</u>		<u>2,306,626</u>	<u>2,297,008</u>	<u>9,618</u>
46,929	9,640	116,010	7,997	11,276	11,164	12,853,388	4,283,722	17,137,110	16,899,031	238,079
108,814	76,991	216,365	156,659	77,553	600,883	43,528,634	7,579,972	51,108,606	50,076,977	1,031,629
						3,379	134	3,513	3,513	
						<u>49,947</u>		<u>49,947</u>	<u>49,947</u>	
						53,326	134	53,460	53,460	
						204,116	15,099	219,215	219,212	3
						<u>5,246</u>		<u>5,246</u>	<u>5,246</u>	
						209,362	15,099	224,461	224,458	3
						9		9	9	
						<u>9,921</u>		<u>9,921</u>	<u>9,921</u>	
						9,930		9,930	9,930	
116,691						393,208	28,555	421,763	549,716	-127,953
<u>-42,535</u>	<u>19,102</u>	<u>118</u>	<u>508</u>	<u>692</u>	<u>466</u>	<u>209,584</u>		<u>209,584</u>	<u>174,492</u>	<u>35,092</u>
74,156	19,102	118	508	692	466	602,792	28,555	631,347	724,208	-92,861
891						470,970	135,633	606,603	664,812	-58,209
<u>180</u>	<u>83</u>	<u>113</u>	<u>349</u>	<u>886</u>	<u>357</u>	<u>109,775</u>		<u>109,775</u>	<u>128,491</u>	<u>-18,716</u>
1,071	83	113	349	886	357	580,745	135,633	716,378	793,078	-76,700
-509	-74	-87	-53	-45	-21	1,879,862	694,342	2,574,204	2,505,657	68,547
<u>3,347</u>	<u>1,452</u>	<u>1,203</u>	<u>-1,750</u>	<u>1,877</u>	<u>1,602</u>	<u>331,322</u>		<u>331,322</u>	<u>329,224</u>	<u>2,098</u>
2,838	1,378	1,116	-1,803	1,832	1,581	2,211,184	694,342	2,905,526	2,834,881	70,645
39						519,425	297,807	817,232	680,217	137,015
<u>758</u>	<u>2,017</u>	<u>820</u>	<u>403</u>	<u>44</u>	<u>88</u>	<u>-37,515</u>		<u>-37,515</u>	<u>35,606</u>	<u>-73,121</u>
797	2,017	820	403	44	88	481,910	297,807	779,717	715,823	63,894
-161,197	-8,966					750,681	370,219	1,120,900	1,228,459	-107,559
<u>145,563</u>	<u>35,278</u>	<u>17,778</u>	<u>8,516</u>	<u>4,271</u>	<u>275</u>	<u>244,644</u>		<u>244,644</u>	<u>285,852</u>	<u>-41,208</u>
-15,634	26,312	17,778	8,516	4,271	275	995,325	370,219	1,365,544	1,514,311	-148,767
32,058	-233	-232	-109			1,845,534	1,085,177	2,930,711	2,854,640	76,071
<u>23,411</u>	<u>17,485</u>	<u>1,127</u>	<u>72,391</u>	<u>10,830</u>	<u>17,697</u>	<u>214,004</u>		<u>214,004</u>	<u>194,726</u>	<u>19,278</u>
55,469	17,252	895	72,282	10,830	17,697	2,059,538	1,085,177	3,144,715	3,049,366	95,349
24,038						418,451	247,649	666,100	638,100	28,000
<u>24,328</u>	<u>12,235</u>	<u>28,346</u>	<u>9,801</u>	<u>5,735</u>	<u>1,993</u>	<u>249,683</u>		<u>249,683</u>	<u>250,603</u>	<u>-920</u>
48,366	12,235	28,346	9,801	5,735	1,993	668,134	247,649	915,783	888,703	27,080
-1,300						856,039	560,438	1,416,477	1,356,929	59,548
<u>-1,300</u>	<u>130</u>	<u>-1,300</u>				<u>3,621,642</u>		<u>3,621,642</u>	<u>3,621,642</u>	
-1,300	130	-1,300				4,477,681	560,438	5,038,119	4,978,571	59,548
165,763	78,509	47,886	90,056	24,290	22,457	12,349,927	3,435,053	15,784,980	15,786,789	-1,809
83,297	-9,615	-749	-442	-234	-165	35,284,034	11,015,025	46,299,059	45,759,168	539,891
<u>191,280</u>	<u>165,115</u>	<u>265,000</u>	<u>247,157</u>	<u>102,077</u>	<u>623,505</u>	<u>20,594,527</u>		<u>20,594,527</u>	<u>20,104,598</u>	<u>489,929</u>
274,577	155,500	264,251	246,715	101,843	623,340	55,878,561	11,015,025 ^(d)	66,893,586 ^(e)	65,863,766 ^(f)	1,029,820 ^(g)

a) Recreation and enhancement costs herein refer only to those capital costs of multipurpose facilities of the State Water Project that are allocated to recreation and enhancement and/or of lands that are acquired for associated recreation development. These costs are budgeted by the Department of Water Resources from funds that are available to the

Department for financing construction costs of the Project.

The remaining recreation and enhancement costs of types not reported herein are budgeted by several state departments and are financed by appropriations from a variety of funds. These costs and appropriations are summarized below:

Type of Recreation and Enhancement Costs Not Reported in Table 1.	General Fund Appropriations, unless otherwise noted		
	1978-79(a)	1977-78(b)	Total 1962-63 thru 1978-79(c)
Allocated operation, maintenance, and replacement costs of multipurpose facilities	\$1,928,000	\$1,890,000	\$12,575,000
Capital costs of recreation developments other than for land acquisition	1,833,000(d)	6,870,000(d)	85,032,000(e)
Operation, maintenance, and replacement costs of recreation developments	4,356,000	3,898,000	20,593,000
a) Proposed amounts in Governor's budget. b) 1977-78 budgeted amount. c) Actual thru 1976-77 plus a) and b). d) Amounts from State recreation bond funds and other State and Federal recreation funds. e) Includes \$1,236,000 from the Harbors and Watercraft Revolving Fund, and \$200,000 directly from the Highway Users Tax Fund.			

Allocated operation, maintenance, and replacement costs of multipurpose facilities are budgeted by the Department of Water Resources and have been financed by annual appropriations from the General Fund. Capital costs (other than land acquisition costs) and operation, maintenance, and replacement costs of recreation develop-

ments are budgeted by the Department of Parks and Recreation -- except that the costs of boating facilities are budgeted by the Department of Navigation and Ocean Development. Costs of enhancement developments are budgeted by the Department of Fish and Game.

b) Joint capital costs allocated to recreation and enhancement are based on the Department's derivation, for each multipurpose facility, of the percentages of the total joint costs that are attributable to each included purpose. These derivations are based on the application of conventional cost allocation methods which weight the estimated costs to be incurred and benefits to be realized during a 50-year period of analysis. Allocated

costs reflect the application of these percentages to the actual capital costs incurred for the facility as accounted by the Department.

Costs allocated to recreation and enhancement generally are first reported in the year following the year construction of a facility is complete. However, these allocated costs may be subsequently changed

counted capital costs or the revision of allocation percentages.

The allocation percentages of a facility may be revised if it can be formally demonstrated that such revision is warranted due to substantial changes in the supporting factors to the previous derivation. Such demonstration could include the finding that (1) funds are not forthcoming for financing the costs of planned recreation developments, with resultant decreases in projected recreation benefits and costs, (2) a change in cost allocation method would

actual visitor days of use had substantially increased or decreased from the previous projections resulting in a change in projected benefits.

The tentative schedule shown below indicates the times when allocated costs of each State Water Project facility will be first reported and when the factors which support the derivation of allocation percentages will be periodically reviewed for substantial changes. Revised allocation percentages for the Oroville Division are included in this report.

TENTATIVE SCHEDULE FOR REPORTING AND REVIEW OF COST ALLOCATIONS

Project Facility	Year Allocation to be Initially Reported	Year Supporting Factors to be Reviewed For Substantial Changes											
		79	80	81	82	83	84	85	86	87	88	89(a)	
Frenchman Lake	1965			x					x				
Antelope Lake	1966			x					x				
Lake Davis	1968		x					x				x	
Abbey Bridge Reservoir	(b)												
Dixie Refuge Reservoir	(b)												
Oroville Division (d)	1971					x					x		
Delta Facilities	1990(c)												
South Bay Aqueduct (Lake Del Valle)	1973			x					x				
California Aqueduct, Project Conservation Facilities: (d)	1970												
Bethany Reservoir						x					x		
San Luis Reservoir						x					x		
O'Neill Forebay						x					x		
Los Banos Reservoir						x					x		
Aqueduct Developments						x					x		
California Aqueduct, Project Transportation Facilities:	1979												
Pyramid Lake								x				x	
Castaic Lake								x				x	
Silverwood Lake								x				x	
Lake Perris								x				x	
Aqueduct Developments								x				x	

a) Reviews would continue in the pattern indicated.
b) Delayed indefinitely.
c) Construction schedule tentative and subject to revision.
d) Will include an evaluation of an allocation of conservation facility costs to recreation and other purposes in Sacramento-San Joaquin Delta.

c) Specific costs of acquiring land for recreation developments are incurred by the Department under the authority of California Water Code Section 346. The Department purchases recreation lands concurrently with lands needed for multipurpose

facilities in order to decrease the total land costs of the Project and to acquire property in an orderly manner. Recreation lands acquired for each project facility through December 31, 1977, are summarized below.

SUMMARY OF RECREATION LAND ACQUISITIONS^(a)
(in acres)
(metric conversion: acres x 0.40469 = hectares)

Project Facility	Acquired ^(b)	To be Acquired	Federal Lands ^(c)	Total
Frenchman Lake	719	0	0	719
Antelope Lake	1,342	0	0	1,342
Lake Davis	733	0	0	733
San Luis Reservoir and O'Neill Forebay	2,518	0	0	2,518
Oroville Division	2,576	0	212	2,788
Lake Del Valle	1,206	0	0	1,206
California Aqueduct (excluding reservoirs)	1,664	^(d)	0	1,664
Castaic Lake	1,915	0	577	2,492
Silverwood Lake	304	0	2,919	3,223
Lake Perris	4,343	123	0	4,466

a) Includes recreation lands for only those project facilities with an established recreation land use and acquisition plan.
b) Costs of acquiring these lands are shown in Table 1.
c) These lands are presently being leased from the Federal Government at a nominal cost to the State.
d) Additional land needs are to be identified by future studies.

The Department reports the annual expenditure of project funds for acquiring all recreation land in the year following the expenditure. The costs of such lands generally are established when acquired and are not affected by allocation percentages for the associated multipurpose project facility. However, the reported costs of certain lands may be subsequently revised due to receipt of certain revenues (such as federal grants and miscellaneous income from right-of-way sales) or due to modification of the recreation land use plan.

The amounts to be reported in future years will include credits for any reduction in previously reported costs, together with appropriate interest income thereon. If recreation land is sold or if grants are received,

the amount of the receipt will be reported as a negative cost of the facility the year received. If recreation land is reclassified as multipurpose project land, the original purchase price, together with appropriate interest income thereon, will be reported as a negative expenditure for specific land costs and an appropriate amount will be added to the joint capital costs allocated to recreation and enhancement for the associated facility.

The costs of acquiring recreation land include the salaries of department personnel who are engaged in recreation land acquisition activities, together with indirect costs that are distributed on the basis of direct salaries.

d) Interest accruals are calculated as shown in Table 2. Interest charges are accrued only on the portion of annual disbursements financed by the California Water Resources Development Bond Fund (proceeds from the sale of Burns-Porter Bonds) and cease when such disbursements, together with cumulative interest accruals thereon, have been reimbursed. Calculations are based on the weighted average interest costs of Burns-Porter Bonds sold to date (4.378 percent for the \$1,570,000,000 in bonds outstanding as of December 31, 1977). This rate differs from the "project interest rate" under the Project's water supply contracts in that interest costs on revenue bond sales are not included.

As of December 31, 1977, a total of \$60,000,000 had been reimbursed to the Department under the continuing annual \$5,000,000 appropriation (thru fiscal year 1977-78) of State tideland oil and gas revenues, authorized by California Statutes of 1966, First Extraordinary Session, Chapter 27. With no allowance for future interest, reimbursement of the increased amount of costs reported herein would cover annual appropriations in the full amounts for 1978-79, together with \$1,893,586 of the appropriation for 1979-80.

e) The Department requests that this total increased amount of reported costs be approved by the Legislature.

f) Costs previously reported are as shown in Table 1 (pages 6 and 7) of Appendix D to Bulletin 132-77. Such costs were based on the Department's accounting records as of December 31, 1976. The average interest cost on Burns-Porter Bond sales was then 4.377 percent.

g) Reasons for cost increase are outlined below:

- ° Additional disbursements during 1977 for recreation lands and for joint capital costs allocated to recreation and enhancement. \$ 623,000
- ° Additional accrued interest on recreation costs not yet reimbursed by the continuing \$5,000,000 annual appropriation due to an additional year of accrual (1977) . . \$ 493,000
- ° Adjustment in costs of the Oroville Division resulting from reallocation of costs of ground water storage studies and litigation . . \$ 3,000
- ° Adjustment in costs of California Aqueduct resulting from reallocation of costs of ground water storage studies and litigation . . \$ -36,000
- ° Adjustment in costs of San Luis Dam and Reservoir and O'Neill Forebay resulting from recalculation of State and Federal shares of specific recreation land costs \$ 34,000
- ° Adjustment in costs of California Aqueduct resulting from redetermination of costs associated with specific recreation land. . . . \$ -86,000
- ° Adjustment in costs of Castaic Dam and Lake due to late reporting of right-of-way acquisition costs . \$ 2,000
- ° Adjustment in costs of Cedar Springs Dam and Silverwood Lake due to decrease in acreage of specific recreation land. \$ -3,000

TOTAL INCREASE \$1,030,000

YEAR	ITEM	JOINT CAPITAL COSTS ALLOCATED TO RECREATION AND ENHANCEMENT								Total
		Frenchman Dam and Lake	Antelope Dam and Lake	Grizzly Valley Dam and Lake Davis	San Luis Dam and Reservoir, O'Neill Forebay, and Los Banos Reservoir	California Aqueduct Delta to Dos Amigos P. P.	Oroville Division	Del Valle Dam and Lake Del Valle		
1952-73	a. Disbursements									
	1. Calif. Water Resources Development Bond Fund	102,997	1,036,428	3,837,871	2,092,382	4,467,377	5,859,586	10,546,762	27,943,	
	2. All other funds	2,433,594	3,942,099	529,753	1,409,397	728,796	3,329,953	2,160,179	14,533,	
	b. Reimbursement 1967 thru 1973 applied to:									
	1. Calif. Water Resources Development Bond Fund	104,800	1,134,824	4,238,538	2,386,330	5,208,344	7,617,102	2,446,491	23,136,	
	2. All other funds	2,433,594	3,942,099	529,753	1,409,397	728,796	3,329,953		12,373,	
	c. Interest accrued to end of 1973	1,803	98,396	400,667	293,948	740,987	1,760,385	3,606,972	6,903,	
1974	d. Beginning-of-year balance to be reimbursed:									
	1. Calif. Water Resources Development Bond Fund					20	2,869	11,707,243	11,710,	
	2. All other funds							2,160,179	2,160,	
	e. Disbursements during year:									
	1. Calif. Water Resources Development Bond Fund				-388		-42		-	
	2. All other funds	1,268	1,949	45,689	13,036	12,394	26,449	116,010	216,	
	f. Reimbursements during year applied to:									
1. Calif. Water Resources Development Bond Fund				-388	20	2,827	4,851,483	4,853,		
2. All other funds	1,268	1,949	45,689	13,036	12,394	26,449		100,		
	g. End-of-year balance, without interest for:									
	1. Calif. Water Resources Development Bond Fund							6,855,760	6,855,	
	2. All other funds							2,276,189	2,276,	
	h. Interest accrual on average balance of d(1) & g(1)						63	406,344	406,	
1975	i. Beginning-of-year balance to be reimbursed:									
	1. Calif. Water Resources Development Bond Fund						63	7,262,104	7,262,	
	2. All other funds							2,276,189	2,276,	
	j. Disbursements during year:									
	1. Calif. Water Resources Development Bond Fund	493	762	84,814	-262	21,653	-18	7,997	-	
	2. All other funds				12,168		29,052		156,	
	k. Reimbursements during year applied to:									
1. Calif. Water Resources Development Bond Fund	493	762	84,814	-262	21,653	45	4,851,260	4,851,		
2. All other funds				12,168		29,052		148,		
	l. End-of-year balance, without interest for:									
	1. Calif. Water Resources Development Bond Fund							2,410,844	2,410,	
	2. All other funds							2,284,186	2,284,	
	m. Interest accrual on average balance of i(1) & l(1)						1	211,741	211,	
1976	n. Beginning-of-year balance to be reimbursed:									
	1. Calif. Water Resources Development Bond Fund						1	2,622,585	2,622,	
	2. All other funds							2,284,186	2,284,	
	o. Disbursements during year:									
	1. Calif. Water Resources Development Bond Fund	1,414	2,701	21,984	-174	3,674	-15	11,276	-	
	2. All other funds				6,048		30,645		77,	
	p. Reimbursements during year applied to:									
1. Calif. Water Resources Development Bond Fund	1,414	2,701	21,984	-174	3,674	-14	2,622,585	2,622,		
2. All other funds				6,048		30,645	2,295,462	2,361,		
	q. End-of-year balance, without interest for:									
	1. Calif. Water Resources Development Bond Fund									
	2. All other funds									
	r. Interest accrual on average balance of n(1) & q(1)							57,408	57,	
1977	s. Beginning-of-year balance to be reimbursed:									
	1. Calif. Water Resources Development Bond Fund							57,408	57,	
	2. All other funds									
	t. Disbursements during year:									
	1. Calif. Water Resources Development Bond Fund	1,518	2,893	9,183	-130	50,530	-14	11,164	-	
	2. All other funds				6,927		518,812		601,	
	u. Reimbursements during year applied to:									
1. Calif. Water Resources Development Bond Fund	1,518	2,893	9,183	-130	50,530	-14	57,408	57,		
2. All other funds				6,927		518,812	11,164	601,		
	v. End-of-year balance, without interest for:									
	1. Calif. Water Resources Development Bond Fund									
	2. All other funds									
	w. Interest accrual on average balance of s(1) & v(1)							1,257	1,	
SUMMARY: 1952 thru 1977	x. Beginning of 1978 balance to be reimbursed:									
	1. Calif. Water Resources Development Bond Fund							1,257	1,	
	2. All other funds									
	Total							1,257	1,	
	y. Disbursements, 1952 thru 1977:									
	1. Calif. Water Resources Development Bond Fund	102,997	1,036,428	3,837,871	2,091,428	4,467,377	5,859,497	10,546,762	27,942,	
	2. All other funds	2,438,287	3,950,404	691,423	1,447,576	817,047	3,934,911	2,306,626	15,586,	
	Total	2,541,284	4,986,832	4,529,294	3,539,004	5,284,424	9,794,408	12,853,388	43,528,	
	z. Reimbursements applied thru 1977 to:									
	1. Calif. Water Resources Development Bond Fund	104,800	1,134,824	4,238,538	2,385,376	5,208,364	7,619,946	14,829,227	35,521,	
2. All other funds	2,438,287	3,950,404	691,423	1,447,576	817,047	3,934,911	2,306,626	15,586,		
Total	2,543,087	5,085,228	4,929,961	3,832,952	6,025,411	11,554,857	17,135,853	51,107,		
TOTAL INTEREST ACCRUALS, 1952 THRU 1977		1,803	98,396	400,667	293,948	740,987	1,760,449	4,283,722	7,579,	

COSTS OF ACQUIRING LAND FOR RECREATION DEVELOPMENT												GRAND TOTAL
Frenchman Dam and Lake	Grizzly Valley Dam and Lake Davis	Abbey Bridge, Dam and Reservoir	San Luis Dam and Reservoir, O'Neill Forebay, and Los Banos Reservoir	California Aqueduct Delta to Dos Amigos P. P.	Oroville Division	Del Valle Dam and Lake Del Valle	California Aqueduct, Dos Amigos P. P. to Termini	Castaic Dam and Lake	Cedar Springs Dam and Silverwood Lake	Perris Dam and Lake Perris	Total	
3,379 49,947	204,116 5,246	9 9,921	393,208 207,800	470,970 108,070	1,880,068 328,390	519,425 -38,870	750,681 213,804	1,845,875 111,959	418,451 203,808	856,039 3,622,942	7,342,221 4,823,017	35,285,624 19,356,788
3,513 49,947	219,215 5,246	9 9,921	421,762 207,800	606,597 108,070	2,529,509 328,390						3,780,605 709,374	26,917,034 13,082,966
134	15,099		28,555	135,633	693,360	184,298	213,893	664,994	142,730	337,327	2,416,023	9,319,181
			1	6	43,919	703,723 -38,870	964,574 213,804	2,510,869 111,959	561,181 203,808	1,193,366 3,622,942	5,977,639 4,113,643	17,687,771 6,273,822
			118	113	-87 1,203	820	17,778	-232 1,127	28,346	-1,300	-319 48,205	-749 265,000
			1 118	6 113	43,832 1,203						43,839 1,434	4,897,781 102,219
						703,723 -38,050	964,574 231,582	2,510,637 113,086	561,181 232,154	1,193,366 3,621,642	5,933,481 4,160,414	12,789,241 6,436,603
					961	30,809	42,229	109,921	24,569	52,246	260,735	667,142
					961	734,532 -38,050	1,006,803 231,582	2,620,558 113,086	585,750 232,154	1,245,612 3,621,642	6,194,216 4,160,414	13,456,383 6,436,603
			508	349	-53 -1,750	403	8,516	-109 72,391	9,801		-162 90,218	-442 247,157
			508	349	908 -1,750						908 -893	4,851,951 148,049
						734,532 -37,647	1,006,803 240,098	2,620,449 185,477	585,750 241,955	1,245,612 3,621,642	6,193,146 4,251,525	8,603,990 6,535,711
					21	32,158	44,078	114,726	25,644	54,533	271,160	482,902
					21	766,690 -37,647	1,050,881 240,098	2,735,175 185,477	611,394 241,955	1,300,145 3,621,642	6,464,306 4,251,525	9,086,892 6,535,711
			692	886	-45 1,877	44	4,271	10,830	5,735		-45 24,335	-234 102,077
			692	886	-24 1,877	12,244					12,220 3,455	2,634,617 2,365,383
						754,446 -37,603	1,050,881 244,369	2,735,175 196,307	611,394 247,690	1,300,145 3,621,642	6,452,041 4,272,405	6,452,041 4,272,405
						33,298	46,008	119,746	26,767	56,920	282,739	340,147
						787,744 -37,603	1,096,889 244,369	2,854,921 196,307	638,161 247,690	1,357,065 3,621,642	6,734,780 4,272,405	6,792,188 4,272,405
			466	357	-21 1,602	88	275	17,697	1,993		-21 22,478	-165 623,505
			466	357	-21 1,602	787,744 -37,515	1,096,889 244,644	2,247,543			4,132,155 209,554	4,189,419 810,581
								607,378 214,004	638,161 249,683	1,357,065 3,621,642	2,602,604 4,085,329	2,602,604 4,085,329
						17,244	24,011	75,790	27,939	59,412	204,396	205,653
						17,244	24,011	683,168 214,004 17,244	666,100 249,683 915,783	1,416,477 3,621,642 5,038,119	2,807,000 4,085,329 6,892,329	2,808,257 4,085,329 6,893,586
3,379 49,947 53,326	204,116 5,246 209,362	9 9,921 9,930	393,208 209,584 602,792	470,970 103,775 580,745	1,879,862 331,322 2,211,184	519,425 -37,515 481,910	750,681 244,644 995,325	1,845,534 214,004 2,059,538	418,451 249,683 668,134	856,039 3,621,642 4,477,681	7,341,674 5,008,253 12,349,927	35,284,034 20,594,527 55,878,561
3,513 49,947 53,460	219,215 5,246 224,461	9 9,921 9,930	421,762 209,584 631,347	606,603 109,775 716,378	2,574,204 331,322 2,905,526	799,988 -37,515 762,473	1,096,889 244,644 1,341,533	2,247,543			7,969,727 922,924 8,892,651	43,490,802 16,509,198 60,000,000
134	15,099		28,555	135,633	694,342	297,807	370,219	1,085,177	247,649	560,438	3,435,053	11,015,025

Summary of Allocation Percentages

The Department annually determines water contractor charges for the State Water Project based on allocations of costs among purposes of those facilities which are jointly used for more than one purpose. These allocations utilize the revised percentages for the Oroville

Division reported herein, and the percentages previously reported to and approved by the Legislature, as well as preliminary estimates for facilities which have not been reported. These percentages are summarized in the table below.

SUMMARY OF COST ALLOCATION PERCENTAGES

(in percent of joint costs of the respective facilities)

Facilities of the State Water Project	Reimbursable Purposes	Nonreimbursable Purposes ^(a)		Total
	Water Supply and Power Generation	Flood Control	Recreation and Fish and Wildlife En- hancement	
<u>Capital Costs of Features Jointly Used</u>				
<u>Project Conservation Facilities</u>				
Frenchman Dam and Lake ^(b)	21.5	0	78.5	100.0
Antelope Dam and Lake ^(b)	0	0	100.0	100.0
Grizzly Valley Dam and Lake Davis ^(b)	5.1	0	94.9	100.0
Oroville Dam and reservoir ^{(b)(d)}	97.1	0	2.9	100.0
California Aqueduct, Delta to Dos Amigos Pumping Plant ^(b)	96.6	0	3.4	100.0
Delta Facilities ^(c)	86.0	0	14.0	100.0
<u>Project Transportation Facilities</u>				
California Aqueduct:				
California Aqueduct excluding Coastal Branch ^{(c)(e)}	97.0	0	3.0	100.0
Coastal Branch	100.0	0	0	100.0
South Bay Aqueduct:				
Del Valle Dam and Reservoir ^(b)	25.2	26.8	48.0	100.0
Remainder of South Bay Aqueduct	100.0	0	0	100.0
North Bay Aqueduct ^(c)	100.0	0	0	100.0
a) Additional purposes may be identified after project formulation in the Delta is completed.				
b) Final percentages, subject to periodic review as discussed on page 9.				
c) Illustrative percentages only, assumed for current project financial and repayment analyses.				
d) Percentages are applicable to Capital Costs of Features Jointly Use, minus Federal Flood Control Payments.				
e) A final allocation of facilities from Delta to Dos Amigos Pumping Plant has been made. 3.4 percent of these costs are allocated to recreation and fish and wildlife enhancement and are reported for reimbursement under AB 12. However, until the remainder of the aqueduct is finally reported the percentage for billing purposes is as shown.				
Note: Percentages shown are those applicable to the costs of the facility as accounted by the State, or, in the case of federal-state joint-use facilities (San Luis and Delta Facilities), only the State's share of the total cost.				

The facilities which remain to be reported are two reservoirs in the Upper Feather River area, the Delta Facilities, and the transportation features of the California Aqueduct. Upon completion of project formulation for the Delta

Facilities, costs may be allocated to purposes other than those shown in the above table. The allocation for the Delta Facilities is scheduled to be reported in 1990 as shown in the Table on page 9.

The Oroville Division of the State Water Project is being operated for the purposes of flood control, water supply and power generation, and recreation and fish and wildlife enhancement. An allocation of Oroville Division costs among these project purposes is required for administration of:

- ° The payment provisions of 31 water supply contracts executed between the State and local water agencies.
- ° The Davis-Dolwig Act provision that the Department shall report to the Legislature the costs of the State Water Project that are allocated to recreation and enhancement.

SPECIAL REQUIREMENTS

The Oroville Division is classified by the "Standard Provisions for Water Supply Contracts" as part of the "initial project conservation facilities", i.e., facilities for which construction was specifically authorized by the Burns-Porter Act for the primary purpose of conserving and making project water available in the Sacramento-San Joaquin Delta. The Oroville Division is subject to the following allocation requirements of the "Standard Provisions", Article 22(e):

- (1) Costs shall be allocated among project purposes by the "separable costs-remaining benefits" method.

- (2) Allocations to purposes the costs of which are to be paid by the United States shall be as determined by the United States.

The second item above is especially pertinent to the Oroville Division. The United States is contributing funds for the portion of Oroville Division costs which are allocated to the purpose of flood control. Under the "Standard Provisions", the final flood control allocation for Oroville must equal the actual federal payments received by the State for that project purpose.

FEDERAL PAYMENTS

The agreement which provides for federal payments for the costs of the Oroville Division allocated to flood control was signed on March 8, 1962. The Secretary of the Army transmitted a report to Congress on June 6, 1962, containing the complete record of the Federal Government's interest in, and approval of, the Oroville Division.

The agreement provides for a total contribution equal to 22 percent of the actual "first" costs (i.e., capital costs less interest costs during the construction period) of Oroville Dam (exclusive of works related to Oroville Intake

Structure and Penstocks and Edward Hyatt Powerplant), Lake Oroville and Feather River Fish Hatchery. The contribution so computed covers not only the first costs of the Division allocated to flood control, but also a capitalized share of projected operation, maintenance, and replacement costs. As of December 31, 1977, payments under the agreement received by the Department totaled \$68,649,980. This amount is herein assumed to be final. However, there may be a future adjustment following the United States' final audit of the Department's accounting records.

The agreement was supported by a derivation of allocation percentages (herein referred to as the "federal allocation") which was prepared under negotiations commencing in July 1957 among the U. S. Army Engineer District, Sacramento; the Department of Water Resources; the Bureau of Reclamation; and the Federal Power Commission. The derivation which was developed under these negotiations was modified by the Chief of Engineers, Department of the Army, and by the Board of Engineers for Rivers and Harbors. The modified derivation of allocation percentages is described in the Department's Bulletin 153-65, "Allocations of Costs Among Purposes of the California State Water Project", January 1965 (pp. 75-87).

In view of considerations summarized below, a revision of the federal allocation of the Oroville Division was required under the "Standard Provisions" and the Davis-Dolwig Act:

- ° Treatment of Flood Control. In the federal allocation, flood control was treated as one of several project purposes of the Oroville Division and was assigned a percentage of the costs of features jointly used. However, the "Standard Provisions" require that the flood control allocation be "frozen" to equal the costs paid by the United States and that the "nonfederal" costs of Oroville Division be suballocated among the remaining purposes.
- ° Treatment of Recreation and Enhancement. The federal allocation did not include recreation and enhancement as purposes of the Oroville Division. The Davis-Dolwig Act requires an allocation of Oroville Division costs to these purposes.
- ° Treatment of Water Supply and Power Generation. The federal allocation was based on procedures whereby water supply benefits were estimated separately for irrigation use and municipal and industrial use. Under the

"Standard Provisions" of the water supply contracts, no distinction is made between irrigation use and municipal and industrial use for cost allocation purposes.

The federal allocation classified the following as single-purpose power generation features: Oroville Intake Structure, Oroville Penstocks, Thermalito Diversion Dam, Thermalito Power Canal, Thermalito Forebay Dam, and Thermalito Afterbay. Actually, these features also serve the purposes of water supply, recreation, and enhancement. The economic costs of "taxes foregone" were associated with power generation costs in the federal allocation -- a procedure which is now obsolete. The federal allocation was based on an assumed net annual power generation benefit of \$17,364,000, after deducting \$1,902,000 annually for energy consumed in the pump-back operation. Under the Oroville-Thermalito Power Sale Contract, executed November 29, 1967, the value of power generation is estimated to average \$16,150,000 annually.

- ° Applicable Interest Rate. In the federal allocation, benefits and costs were expressed in equal annual equivalents at 4 percent and 3-1/2 percent interest, respectively. Under the "Standard Provisions", both equal annual equivalent benefits and costs should be computed at the "project interest rate"; the interest rate basic to payments of reimbursable State Water Project Costs. As of December 31, 1977, the "project interest rate" was 4.462 percent.

In the revised derivation of allocation percentages presented herein, the benefits and costs are expressed in equal annual equivalents at 4.462 percent interest.

PREVIOUS DERIVATION OF ALLOCATION PERCENTAGES

The derivation of allocation percentages for the Oroville Division was first reported to the Legislature, in compliance with the Davis-Dolwig Act, in Bulletin 132-71, Appendix D, "Costs of Recreation and Fish and Wildlife Enhancement", March 1971, and was approved by the California Statutes of 1971, Chapter 371. That derivation included the purposes of (1) water supply, (2) power generation, and (3) recreation and enhancement, and resulted in the following percentage allocation of joint costs:

(1) Water Supply	
Capital	61.3%
Minimum OMP&R	20.5%
(2) Power Generation	
Capital	35.8%
Minimum OMP&R	78.5%
(3) Recreation and Enhancement	
Capital	2.9%
Minimum OMP&R	1.0%

The following factors supporting the initial Oroville Division cost allocation have substantially changed.

- ° Power generation was a separate project purpose in the initial allocation of Oroville Division costs. In 1971, costs allocated to power generation were required for computing the unit surcharge, under Article 30(b) of the

Standard Provisions of the Water Supply Contract, to be assessed project water applied on "excess lands". Article 30(b) has been deleted from the water supply contracts; therefore, power generation is no longer a separate purpose in the Oroville cost allocation.

- ° In the initial Oroville cost allocation and the revised allocation, costs and benefits are stated in equal annual equivalent values for the 50-year period 1969 through 2018. The initial allocation was based on an interest rate of 4.357 percent. The revised allocation is based on the current project interest rate of 4.462 percent.
- ° The initial cost allocation for the Oroville Division included only recreation and enhancement benefits occurring in the Oroville Division. The revised derivation of allocation percentages includes recreation and enhancement benefits in the Sacramento-San Joaquin Delta resulting from operation of Oroville Division facilities. However, to date, the operation of the Oroville Division has not benefited the Delta. Table 5, shows net recreation and enhancement benefits in the Delta as zero.

DERIVATION METHOD

The revised derivation of allocation percentages for the joint costs of the Oroville Division is summarized in Table 3. Computational steps for the derivation are outlined in Table 3a.

The costs of a multipurpose facility are estimated and accounted as the sum of specific costs (costs of features of the facility which can be readily identi-

fied as serving one project purpose exclusively -- such as recreation developments) and joint costs (costs of features which generally serve more than one purpose -- such as multipurpose dams and reservoirs). The specific costs of recreation developments (except for associated land costs) are accounted by agencies other than the Department of Water Resources and are financed by

REVISED DERIVATION OF ALLOCATION PERCENTAGES
FOR THE OROVILLE DIVISION

(in thousands of dollars unless otherwise noted)

Line No.	Item of Benefit or Cost ^(a)	Water Supply ^(b)	Recreation ^(c)	Total
1.	Benefits	64,717	2,741	67,458
2.	Alternative Costs	29,846	14,405	44,251
3.	Justifiable Costs	29,846	2,741	32,587
4.	Separable Costs:			
	Total	17,581	2,140	19,721
	Capital	13,281	1,074	14,355
	Minimum OMP&R	4,300	1,066	5,366
5.	Remaining Justifiable Costs	12,265	601	12,866
6.	Percent Distribution of Remaining Justifiable Costs	95.3%	4.7%	100.0%
7.	Remaining Joint Costs:			
	Total	11,689	576	12,265
	Capital	11,387	561	11,948
	Minimum OMP&R	302	15	317
8.	Total Allocated Project Costs:			
	Total	29,270	2,716	31,986
	Capital	24,668	1,635	26,303
	Minimum OMP&R	4,602	1,081	5,683
9.	Percent Distribution of Total Project Costs:			
	Total	91.5%	8.5%	100.0%
	Capital	93.8%	6.2%	100.0%
	Minimum OMP&R	81.0%	19.0%	100.0%
10.	Specific Costs, This Allocation:			
	Total	7,065	2,140	9,205
	Capital	5,637	1,074	6,711
	Minimum OMP&R	1,428	1,066	2,494
11.	Allocated Costs of Features Jointly Used:			
	Total	22,205	576	22,781
	Capital	19,031	561	19,592
	Minimum OMP&R	3,174	15	3,189
12.	Percent Distribution of Costs of Features Jointly Used:			
	Total	97.5%	2.5%	100.0%
	Capital	97.1%	2.9%	100.0%
	Minimum OMP&R	99.5%	0.5%	100.0%

a) Annual benefits and costs through year 2018 converted to equal annual equivalent values at 4.462% interest, for 50-year period 1969-2018.

b) Includes associated purpose of power generation.

c) Includes associated purpose of fish and wildlife enhancement in the Oroville Division and the Sacramento-San Joaquin Delta.

OUTLINE OF CALCULATIONS FOR DERIVING ALLOCATION PERCENTAGES^a

Step No.	Calculation
1	alternative water supply costs (\$29,846,000) = justifiable water supply cost (\$29,846,000) ^(b)
2	recreation benefits (\$2,741,000) = justifiable recreation costs (\$2,741,000) ^(b)
3	total project costs (\$31,986,000) - hypothetical recreation project costs (\$14,405,000) = separable water supply costs (\$17,581,000)
4	total project costs (\$31,986,000) - hypothetical water supply project costs (\$29,846,000) = separable recreation costs (\$2,140,000)
5	justifiable water supply costs (\$29,846,000) - separable water supply costs (\$17,581,000) = remaining justifiable water supply costs (\$12,265,000)
6	justifiable recreation costs (\$2,741,000) - separable recreation costs (\$2,140,000) = remaining justifiable recreation costs (\$601,000)
7	remaining justifiable water supply costs (\$12,265,000) + remaining justifiable recreation costs (\$601,000) = total remaining justifiable costs (\$12,866,000)
8	$\frac{\text{remaining justifiable water supply costs } (\$12,265,000)}{\text{total remaining justifiable costs } (\$12,866,000)} \times 100 = \text{percent distribution of remaining justifiable water supply costs } (95.3\%)$
9	$\frac{\text{remaining justifiable recreation costs } (\$601,000)}{\text{total remaining justifiable costs } (\$12,866,000)} \times 100 = \text{percent distribution of remaining justifiable recreation costs } (4.7\%)$
10	total allocated project costs (\$31,986,000) - total separable costs (\$19,721,000) = total remaining joint costs (\$12,265,000)
11	total remaining joint costs (\$12,265,000) x percent distribution of remaining justifiable water supply costs (95.3%) = remaining joint water supply costs (\$11,689,000)
12	total remaining joint costs (\$12,265,000) x percent distribution of remaining justifiable recreation costs (4.7%) = remaining joint recreation costs (\$576,000)
13	remaining joint water supply costs (\$11,689,000) + separable water supply costs (\$17,581,000) = total costs allocated to water supply (\$29,270,000)
14	remaining joint recreation costs (\$576,000) + separable recreation costs (\$2,140,000) = total costs allocated to recreation (\$2,716,000)
15	specific water supply costs (\$7,065,000) + specific recreation costs (\$2,140,000) = total specific costs (\$9,205,000)
16	total costs allocated to water supply (\$29,270,000) - specific water supply costs (\$7,065,000) = joint costs allocated to water supply (\$22,205,000)
17	total costs allocated to recreation (\$2,716,000) - specific recreation costs (\$2,140,000) = joint costs allocated to recreation (\$576,000)
18	joint costs allocated to water supply (\$22,205,000) + joint costs allocated to recreation (\$576,000) = total joint costs (\$22,781,000)
19	$\frac{\text{joint costs allocated to water supply } (\$22,205,000)}{\text{total joint costs } (\$22,781,000)} \times 100 = \text{percent of joint costs allocated to water supply } (97.5\%)$
20	$\frac{\text{joint costs allocated to recreation } (\$576,000)}{\text{total joint costs } (\$22,781,000)} \times 100 = \text{percent of joint costs allocated to recreation } (2.5\%)$
21	percent of joint costs allocated to water supply (97.5%) + percent of joint costs allocated to recreation (2.5%) = 100%

a) Applicable to the total costs (Capital and OMP&R) of features jointly used by project purposes, exclusive of Flood Control costs.

b) Justifiable costs for each purpose are the total benefits of that purpose or the costs of the least expensive single-purpose alternative providing the same benefits, whichever are less.

funds other than project funds. All other specific costs and all joint costs of the State Water Project facilities are accounted by the Department and financed by Project funds.

The costs of a multipurpose facility also may be estimated (but not accounted) on the basis of separable costs and remaining joint costs. (Separable costs are estimated for each purpose of a multipurpose facility as the difference in the estimated total costs of the facility less the estimated costs of a similar facility designed so as to exclude the particular purpose. The separable costs of a facility are the total separable costs for all purposes of the facility. The remaining joint costs are the differences in the estimated total costs of the facility less the estimated separable costs of the facility.)

Justifiable costs are the estimated maximum expenditures which theoretically would be justified to realize the benefits of a multipurpose facility. Remaining justifiable costs are those justifiable costs in excess of the sum of the separable costs of the facility.

The derivation of allocation percentages for the Oroville Division, as shown in Table 3, must follow the sep-

arable costs-remaining benefits allocation method which is required by the "Standard Provisions". Under this method, total costs of the multipurpose facility are allocated to each purpose to be accommodated by the facility by the sum of:

- ° The estimated separable costs of each purpose (Item 4 of Table 3).
- ° A share of the estimated remaining joint costs allocated among purposes (Item 7 of Table 3) on the basis of remaining justifiable costs of each purpose (Item 5 and 6).

Conventionally, the total costs allocated to each purpose (Item 8), expressed as a percentage of such total costs (Item 9), are the final result of the allocation procedure. However, since some of the specific costs of the State Water Project are accounted by agencies other than the Department of Water Resources, the percentage of each purpose's allocation of the estimated total costs must be adjusted to a percentage applicable only to the estimate joint costs (Item 11) by deducting the estimated specific costs. The resulting percentages can then be applied to the actual joint costs of project facilities as accounted by the Department.

BENEFITS

Benefits are the net value of goods and services that will directly result from operation of the Oroville Division.

Water Supply Benefits

The project purpose of water supply includes the development of a water supply in project conservation facilities, and making the water supply available for export to State Water Project service areas.

Measure of Water Supply Benefits.

Water supply benefits are measured at the points of delivery from the project facilities and are evaluated by different methods for agricultural use and for municipal and industrial use.

The measure of benefit for agricultural use is taken as the difference between net returns from farming operations with and without project water, reduced by the costs of local distribution systems between project facilities and farm headgates. The net return from farming

operations is considered to be the remainder of gross income less all farm expenses (except water costs and either land rental or interest on land investment).

The measure of benefit for municipal and industrial use is taken as the cost of an equivalent water supply so used from the least expensive of any source --multipurpose or single-purpose--other than project facilities, as limited by the estimated maximum price users are willing to pay.

The estimated water supply benefits of the State Water Project, exclusive of

the Upper Feather Division, are shown in Table 4. These estimates reflect entitlement water service under long-term contracts. Excluded are surplus water service under short-term contracts and federal water service from joint state facilities.

Costs and unit benefits used in this exhibit are the same as were used in the previous cost allocation for the Oroville Division with the exception of updating the project interest rate and combining the project purposes of water supply and power generation. Therefore, the water supply unit benefits shown in Table 4 are the same as shown in Bulletin 132-71, Appendix D, page 20.

TABLE 4

TOTAL WATER SUPPLY BENEFITS
OF THE STATE WATER PROJECT (a)

Service Area	Maximum Annual Entitlement (b) (acre-feet)	Equal Annual Equivalent Entitlements (c) (acre-feet)	Estimated Unit Net Benefit (d) (dollars per acre-foot)	Equal Annual Equivalent Net Benefits (c) (thousands of dollars)
Feather River	37,100	16,612	10.00	166
North Bay	67,000	29,722	23.87	709
South Bay	188,000	152,520	38.00	5,796
San Joaquin Valley	1,355,000	879,134	31.47	27,666
Central Coastal	82,700	32,395	181.81	5,890
Southern California	2,497,500	1,463,250	204.41	299,103
Total, State Water Project	4,227,300	2,573,633	131.85	339,330

a) Excluding the facilities in the Upper Feather Division.

b) Existing as of January 1, 1978 (Bulletin 132-77).

c) Annual values through 2018, converted to equal annual equivalents for the 50-Year period, 1969-2018, at 4.462 percent interest.

d) Measured at the points of delivery from project facilities.

Distribution of Water Supply Benefits Among Project Facilities. Water supply benefits are derived from the combined operation of project conservation facilities and project transportation facilities, except for the relatively minor reservoirs in the Upper Feather Division, which are operated primarily for local needs. Costs of these facilities are allocated separately among project purposes. To compute such cost allocations, total project water supply benefits are distributed among the component facilities of the State Water Project, including the Additional Facilities, in the same proportion as the water supply costs of those facilities.

The portion of the total water supply benefits of the project that are assignable to the Oroville Division is estimated to be \$64,717,000 annually.

- (a) Estimated total costs of the Oroville Division allocable to water supply (Table 3, Line 8). \$ 29,270,000.
- (b) Estimated total costs of the State Water Project allocable to water supply, excluding the Upper Feather Division. . . \$153,470,000.
- (c) Percent (a) of (b). . . . 19.072%.
- (d) Estimated total water supply benefits of the State Water Project, excluding the Upper Feather Division (from Table 4). \$339,330,000.
- (e) Total water supply benefits assigned to the Oroville Division (Table 3, Line 1). \$ 64,717,000.

Recreation and Enhancement Benefits. Projected recreation use and associated benefits of the Oroville Division, exclusive of the Oroville Borrow Area, are based on studies conducted in 1969 by the Department of Parks and Recreation. Projected recreation use and associated benefits for the Oroville Borrow Area are based on the Department's Bulletin

117-18, "Oroville Borrow Area - Water Resources Recreation Report", June 1968. Projections of recreation use in this presentation are the same as in the initial Oroville allocation reported in Bulletin 132-71, Appendix D.

Recreation benefit unit values used in this presentation are the same as were used in the previous cost allocation for the Oroville Division. Unit values used by the Department to evaluate general recreation benefits vary from \$0.50 to \$2.50 per recreation day. Two factors are used to determine these unit values: (1) variety and quality of recreation, (2) esthetic qualities of the site. The types of recreation activity evaluated are: boating, swimming, camping, fishing, hunting, picnicking, enjoyment of wildlife, water skiing, horseback riding, hiking, cycling, and scientific-historic appreciation.

The Department of Parks and Recreation has established procedures for rating each of the aforementioned factors. These rating procedures provide up to 100 points for each factor, or a maximum of 200 points considering both factors. The points are directly convertible to cents. The dollar value of a recreation day is obtained by adding the rated values for the two factors to the \$0.50 minimum. Thus, the maximum value resulting from this evaluation is \$2.50 per recreation day.

The Department of Parks and Recreation has signed contracts with Fun Time Full Time and California Community Developers for operation of concessions at Lake Oroville. Terms of these contracts provide for payment to the State of a percentage of gross annual receipts. Estimates of concessionaire payments herein are based on the assumption that recreationists will spend an average of \$0.50 per recreation day at the concessions. These estimates of payments are added to the recreation use benefits to arrive at the total recreation benefit figure for the Oroville Division.

TABLE 5

TOTAL RECREATION AND FISH AND
WILDLIFE ENHANCEMENT USE AND
BENEFITS IN THE OROVILLE DIVISION

(all units in thousands)

Decade	Use (Recreation Days)		Increase Due to Oroville Division			
	Without Oroville Division	With Oroville Division	Use (Recreation Days)	Benefits (dollars)		
				Recreation Use Totals	Conces- sionaire Payments ^(a)	Equal Annual Equivalent
<u>Lake Oroville (b)</u>						2,451
1969-78	1,280	2,830	1,550	3,062	59	
1979-88	1,525	7,970	6,445	12,935	120	
1989-98	1,775	19,360	17,585	34,315	340	
1999-08	2,025	35,765	33,740	65,274	690	
2009-18	2,275	52,005	49,730	95,917	1,078	
<u>Thermalito Forebay (c)</u>						155
1968-78	0	371	371	623		
1979-88	0	910	910	1,538		
1989-98	0	1,270	1,270	2,146		
1999-08	0	1,630	1,630	2,755		
2009-18	0	1,990	1,990	3,363		
<u>Oroville Borrow Area (d)</u>						135
1970-78	189	582	393	546		
1979-88	266	1,272	1,006	1,266		
1989-98	320	1,840	1,520	1,864		
1999-08	368	2,408	2,040	2,465		
2009-18	408	2,938	2,530	3,028		
<u>Sacramento-San Joaquin Delta (e)</u>						
1969-2018			0	0		0
<u>TOTAL, OROVILLE DIVISION</u>						<u>2,741</u>

Based on the following unit values per recreation day:

- a) \$0.50 per recreation day.
- b) \$1.50, without Oroville Division; \$1.54 for 1969-1972 and \$1.91 for 1973-2018, with Oroville Division.
- c) \$1.64 for 1968-1971 and \$1.69 for 1972-2018, with Oroville Division.
- d) \$0.50, without Oroville Division; \$1.10 for entire period, with Oroville Division.
- e) Current operation of the State Water Project does not result in a net benefit in the Delta.

Projected recreation use attributable to the Oroville Division, estimated recreation and enhancement benefits and concessionaire payments are summarized in Table 5. The total equal annual equivalent recreation benefit for the Oroville Division for the 50-year period, 1969 through 2018, at 4.462 percent

interest is estimated to be \$2,741,000. Table 5 includes estimated recreation and enhancement benefits in the Sacramento-San Joaquin Delta attributable to releases of water from Oroville. However, the Oroville Division has not enhanced the Delta and there are no net enhancement benefits.

TOTAL PROJECT COSTS

The estimated total project costs of the Oroville Division are summarized in Table 6. The total cost of the Oroville

Division in this presentation, is the sum of all costs, less the actual Federal flood control payments.

TABLE 6

TOTAL PROJECT COSTS

(thousands of dollars)

Project Features	First Costs (a)	Equal Annual Equivalent Costs at 4.462% Interest: 50-Year Period 1969-2018		
		Capital	OMP&R	Total
Multipurpose Facilities in the Oroville Division	396,914	23,473	3,189	26,662
Federal Flood Control Payments	-68,650	-3,881	--	-3,881
Specific Power Generation Features	104,938	5,637	1,428	7,065
Specific Recreation Features	53,387	1,074	1,066	2,140
Totals	486,589	26,303	5,683	31,986

a) "First Costs" represent total capital costs exclusive of interest charges during construction.

Federal Payments For Flood Control

Actual payments by the United States for flood control costs of the Oroville Division through December 31, 1977 were:

1962.	\$13,950,000
1964.	13,040,000
1965.	8,000,000
1966.	12,405,000
1967.	7,255,236
1968.	1,974,764
1969.	9,907,465
1970.	1,096,035
1971.	600,000
1977.	<u>421,480</u>

Total actual payments \$68,649,980

These payments are equivalent to
\$3,881,000 annually at 4.462 percent

interest for the 50-year period 1969 through 2018. Under the "Standard Provisions", ". . . allocations to purposes the costs of which are paid by the United States shall be as determined by the United States." [Article 22(e)].

Since payments made by the United States are based on a percentage of certain joint costs of the Oroville Division, the costs assigned to the project purpose of flood control represent a portion of the total project costs as shown in Table 6.

The allocation percentages derived herein are essentially a suballocation of nonfederal costs of the Oroville Division.

ALTERNATIVE COSTS

In project formulation and cost allocation studies, the "alternative costs" of a purpose included in a multipurpose facility are estimated as the costs of the least expensive single-purpose alternative means that would provide the same benefits for that purpose as would the multipurpose facility. Alternative means include the possible construction of a single-purpose facility at the same site as the multipurpose facility. Inclusion of a purpose in the planned operation of a multipurpose facility is justified only if the costs allocated to the purpose do not exceed the alternative costs or the benefits of the purpose, whichever is less.

Water Supply Alternative Costs. The least expensive alternative means of providing the same water yield and water

supply benefits as the multipurpose Oroville Division is estimated to be those multipurpose facilities resized so as to accommodate the purpose of water supply and power generation only. The costs of the single-purpose water supply and power generation facilities essentially would be the costs of the jointly used features of the Oroville Division. Specific recreation and fish and wildlife enhancement features would not be needed. Thus, the cost of the alternative single-purpose water supply and power generation facilities is equal to the total multipurpose costs of the Oroville Division, less the specific costs of recreation and fish and wildlife enhancement features.

The total estimated costs of this hypothetical facility are summarized in Table 7.

TABLE 7

WATER SUPPLY ALTERNATIVE COSTS

(thousands of dollars)

Item	First Costs	Equal Annual Equivalent Costs at 4.462% Interest: 50-Year Period 1969-2018		
		Capital	OMP&R	Total
Total Project Costs	486,589	26,303	5,683	31,986
Less: Costs Attributable to Recreation	53,387	1,074	1,066	2,140
Remainder: Water Supply Alternative Costs	433,202	25,229	4,617	29,846

Recreation and Fish and Wildlife Enhancement Alternative Costs. The least expensive alternative means of providing the same recreation and enhancement benefits as the Oroville Division is estimated to be a single-purpose reservoir at the Oroville site with a

gross storage capacity of 1 518 438 500 cubic metres (1,231,000 acre-feet), together with essentially the same recreation and fish and wildlife features as the Oroville Division has. Table 8 summarizes the total estimated costs of this hypothetical single-purpose facility.

TABLE 8

RECREATION AND ENHANCEMENT
ALTERNATIVE COSTS

(thousands of dollars)

Item	First Costs	Equal Annual Equivalent Costs at 4.462% Interest: 50-Year Period 1969-2018		
		Capital	OMP&R	Total
Single - Purpose Oroville Dam and Reservoir (1,231,000 AF Capacity)	209,532	11,948	317	12,265
Specific Recreation Features	53,387	1,074	1,066	2,140
Totals	262,919	13,022	1,383	14,405

In project formulation and cost allocation studies, the separable cost of a particular purpose of a multipurpose facility is the estimated cost of accommodating that purpose in the planned construction and operation of the multipurpose facility. The separable cost of a particular purpose is the difference between the following two cost estimates: (a) the total cost of the multipurpose facility; and (b) the total estimated costs of a hypothetical facility planned to accommodate all purposes of the complete multipurpose facility except the particular purpose. The total separable costs of the multipurpose facility is the total of the separable

costs for all purposes accommodated in the planned construction and operation of the facility.

Water Supply Separable Costs. If the Oroville Division were redesigned to accommodate all project purposes except water supply and power generation, the hypothetical facility would include a 1 518 400 000 cubic metre (1,231,000 acre-foot) reservoir and essentially the same recreation features as the complete Oroville Division. Thermalito Diversion Dam, Power Canal, Forebay, Afterbay, and power generation facilities would not be included. Table 9 summarizes the separable costs of water supply and power generation.

TABLE 9
WATER SUPPLY SEPARABLE COSTS
(thousands of dollars)

Item	First Costs	Equal Annual Equivalent Costs at 4.462% Interest: 50-Year Period 1969-2018		
		Capital	OMP&R	Total
Total Project Costs	486,589	26,303	5,683	31,986
Less: Hypothetical Facilities for Recreation and Fish and Wildlife Enhancement (Recreation Alternative Costs)	262,919	13,022	1,383	14,405
Remainder: Water Supply Separable Costs	223,670	13,281	4,300	17,581

Recreation and Enhancement Separable Costs. The separable costs of recreation and enhancement are estimated to be the difference between the total estimated costs of the complete Oroville Division and the estimated costs of a modified division which would exclude the recreation and enhancement features:

The remaining features would be essentially of the same capacities as the multipurpose Oroville Division. Therefore, the estimated separable costs of recreation and enhancement are the same as the estimated specific costs of recreation and enhancement features and are summarized in Table 10.

TABLE 10
RECREATION AND ENHANCEMENT
SEPARABLE COSTS

(thousands of dollars)

Item	First Costs	Equal Annual Equivalent Costs at 4.462% Interest: 50-Year Period 1969-2018		
		Capital	OMP&R	Total
Total Project Costs	486,589	26,303	5,683	31,986
<i>Less:</i> Hypothetical Facilities for Water Supply and Power Generation	433,202	25,229	4,617	29,846
<i>Remainder:</i> Separable Recreation and Fish and Wildlife Enhancement Costs	53,387	1,074	1,066	2,140

COMMENTS
BY
THE DEPARTMENT OF NAVIGATION AND OCEAN DEVELOPMENT,
THE DEPARTMENT OF PARKS AND RECREATION,
AND THE DEPARTMENT OF FISH AND GAME

Memorandum

To : Hon. Ronald Robie, Director
Department of Water Resources
1416 Ninth Street
Sacramento, California 95814

Date : March 24, 1978

Subject: Cost Allocations to
Recreation and Fish
and Wildlife Enhancer
State Water Project

From : Department of Navigation and Ocean Development

Roa

The Department of Navigation and Ocean Development, in accordance with Section 11912 of the California Water Code, has reviewed Appendix D to the Department of Water Resources' Bulletin No. 132-78 and we have no comment.

Marty
MARTY MERCADO
Director

Memorandum

Date : APR 5 1978

To : Honorable Ronald B. Robie, Director
Department of Water Resources

From : Department of Parks and Recreation

Subject: Cost Allocations to Recreation and Fish
and Wildlife Enhancement, State Water
Project

The California Department of Parks and Recreation has reviewed the Appendix D - Costs of Recreation and Fish and Wildlife Enhancement Draft.

We have no comments.



Russell Cahill
Director

Memorandum

To : Mr. Ronald B. Robie, Director
Department of Water Resources

Date: March 28, 1978

From : Department of Fish and Game

Subject: Water Project - State of California, Department of Water Resources -
State Water Project - 1978 Cost Allocation to Recreation, Fish and
Wildlife Enhancement

Pursuant to Water Code, Section 11912, as amended by California Statutes of 1966, Chapter 27, you requested our written comments on State Water Project joint costs allocated to recreation, fish and wildlife enhancement, as reported in the review draft of Appendix D to Bulletin No. 132-78.

Appendix D presents new costs allocated to recreation, fish and wildlife enhancement of \$623,000. This amount is due to increased disbursements in recreation lands and for joint capital costs allocated to recreation enhancement. There is \$493,000 of accrued interest to recreation, fish and wildlife enhancement added for 1977 and adjustments in various capital facilities to recreation enhancement amounting to a minus \$86,000. The total increased allocation to recreation, fish and wildlife enhancement is \$1,030,000.

The Department of Fish and Game has reviewed the 1978 cost allocation and finds the allocation consistent with established procedure. The department, therefore, supports that portion of this allocation that is within our jurisdiction of evaluation.

EC Fullerton
Director

CONVERSION FACTORS

English to Metric System of Measurement

Quantity	English Unit	Multiply by*	To get metric equivalent
Length	Inches (in)	25.4	millimetres (mm)
		.0254	metres (m)
	feet (ft)	.3048	metres (m)
	miles (mi)	1.6093	kilometres (km)
Area	square inches (in ²)	6.4516 x 10 ⁴	square metres (m ²)
	square feet (ft ²)	.092903	square metres (m ²)
	acres	4046.9	square metres (m ²)
		.40469	hectares (ha)
		.40469	square hectometres (hm ²)
		.0040469	square kilometres (km ²)
	square miles (mi ²)	2.590	square kilometres (km ²)
Volume	gallons (gal)	3.7854	litres (l)
		.0037854	cubic metres (m ³)
	million gallons (10 ⁶ gal)	3785.4	cubic metres (m ³)
	cubic feet (ft ³)	.028317	cubic metres (m ³)
	cubic yards (yd ³)	.76455	cubic metres (m ³)
	acre-feet (ac-ft)	1233.5	cubic metres (m ³)
		1.2335	cubic dekametres (dm ³)
		.0012335	cubic hectometres (hm ³)
Volume Time (Flow)		1.233 x 10 ⁻⁶	cubic kilometres (km ³)
	cubic feet per sec (ft ³ /s)	28.317	litres per second (l/s)
		.028317	cubic metres per sec (m ³ /s)
	gallons per minute (gal/min)	.06309	litres per second (l/s)
		6.309 x 10 ⁻⁵	cubic metres per sec (m ³ /s)
	million gallons per day (mgd)	.043813	cubic metres per sec (m ³ /s)
Water Usage	acre-feet per acre	.3048	cubic metres per square metre (m ³ /m ²)
Mass	pounds (lb)	.45359	kilograms (kg)
	tons (short, 2,000 lb)	.90718	tonne (t)
		907.18	kilograms (kg)
Power	horsepower (hp)	0.7460	kilowatts (kW)
Pressure	pounds per square inch (psi)	6894.8	pascal (Pa)
* For greater accuracy, use conversion factors in "Metric Practice Guide" (American Society for Testing and Materials, E 380-72).			

